SAE Aerospace
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AEROSPACE RECOMMENDED PRACTICE

SAE ARP5257

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Tire Overspeed Landing Test

RATIONALE

This document has been reaffirmed to comply with the SAE 5-Year Review policy.

1. SCOPE:

This document covers the basis of, and test procedure for, an overspeed landing test on aircraft tires with rated speeds of 190 mph (306 km/h) and above. The conditions requiring an overspeed test, alternatives, test requirements and pass/fail criteria are addressed.

1.1 Purpose:

The purpose of this ARP is to define a test procedure for the qualification of aircraft tires to an overspeed landing requirement.

2. REFERENCES:

There are no referenced publications specified herein.

3. OVERSPEED LANDING TEST JUSTIFICATION:

3.1 Definition:

An overspeed landing is a landing which is made at a speed above the rated speed of the tire. As such, it would not fall within the normal operational conditions of the airplane but would result from a failure condition on the airplane.

3.2 Applicability:

The overspeed landing requirements arise from failure conditions on the airplane, specifically failures which preclude getting the aircraft into a normal landing configuration. An example of such a failure is the inability to move a variable sweep wing into the forward position for landing. Another case is the condition in which a failure prevents the extension of flaps to the landing position. This failure may result in an overspeed landing, if the failure occurred when the airplane was near takeoff weight and the means or time were not available to dump. Each aircraft should be evaluated as to the applicability of this test.

3.3 Alternatives:

Demonstrating overspeed landing capability of a tire is an alternative to the selection of a tire with a speed rating sufficient to meet this failure condition. Since the overspeed landing is a rare occurrence and is related to a failure, use of a higher speed rated tire is not considered necessary. The intent of this test is to insure that if such a failure occurs, the tires will have sufficient capability to make a successful landing. Continued serviceability of the tire is not a required.

4. TEST DEFINITION:

4.1 Test Specimen:

The test tire may be either a new tire or a tire used in other testing, whichever is more critical. The tire shall be inflated at room temperature to the rated pressure (corrected for flywheel curvature).

4.2 Test Parameters:

The temperature of the tire carcass or contained gas shall be at least 105 °F (40.5 °C) at the start of the test. No adjustment in tire pressure may be made during the test. Tire load shall be rated load. The initial speed shall be the rated speed plus 25 mph (40 km/h). The 25 mph represents a reasonable margin over rated speed, capable of covering most failure conditions. If the overspeed landing requirement for the airplane is higher than 25 mph over the rated speed of the tire, consideration should be given to a tire with a higher speed rating.

4.3 Test Conduction:

The tire shall be subjected to one overspeed load-speed-time cycle as shown in Table 1:

TABLE 1

Symbol	Time (s)	Speed (mph)	Load
T_0	0	Rated +25	0
T_1	2	Rated +25	Rated
T_2	End	0	Rated

The end time should be determined using a deceleration of 5 ft/s/s (1.52 m/s/s) from the initial velocity to a complete stop. In any case, the total roll distance should not exceed 13,500 ft (4115 m). The 13,500 ft roll distance represents the maximum expected runway length available for stopping. The load-speed-time cycle is shown in Figure 1.

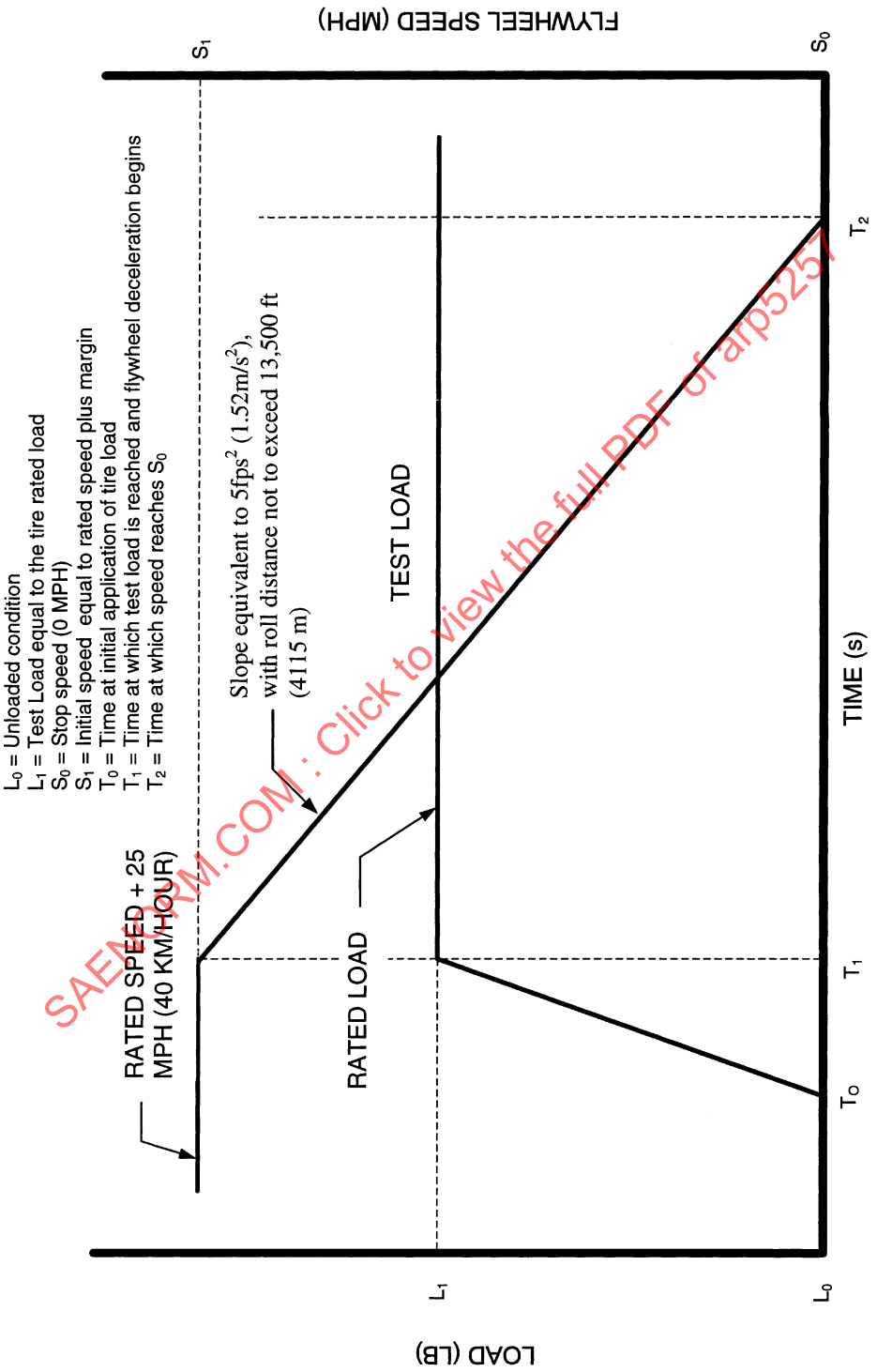

FIGURE 1 - Overspeed Landing Load-Speed-Time Cycle